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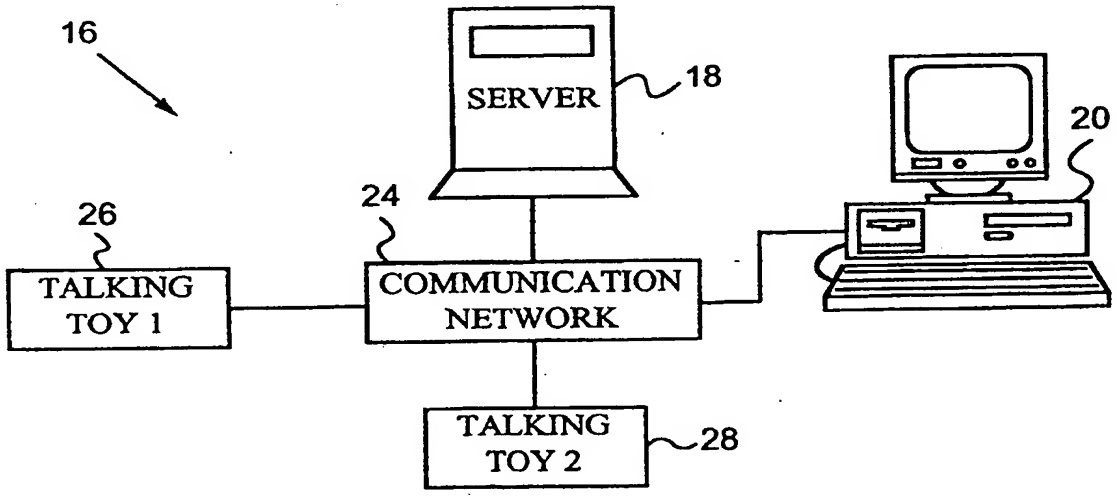

(57) Abstract

A networked communication system which includes at least one talking toy for communicating messages to an individual. The system also includes a server and a remote interface connected to the server for specifying the messages to be communicated. The talking toy is connected to the server via a communication network, preferably the Internet. The server includes a script generator for generating script programs which are executed by the talking toy to deliver the messages. The script programs may be executed by the talking toy at user–specified times to deliver the messages to a user at specified times. The talking toy includes a modem for receiving the script programs from the server, a microcontroller for executing the script programs, and a speech synthesizer for audibly communicating the messages to the individual. The talking toy may further include at least one user interface means, and a signaling means for signaling a user that a message is waiting. Because the talking toy may be programmed remotely through the use of script programs, the system allows flexible and dynamic updating of the messages delivered by the toy, as well as tailoring of the messages to the needs of an individual user or group of users.

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REMOTELY PROGRAMMABLE TALKING TOY

for

FIELD OF THE INVENTION

The present invention relates generally to talking toys such as interactive dolls, and in particular to a remotely programmable talking toy which interacts with a user in accordance with script programs received through a communication network.

BACKGROUND OF THE INVENTION

Since their inception, talking toys have enjoyed considerable popularity in the marketplace. The talking toys are typically embodied as dolls, teddy bears, action figures, or robots which entertain or instruct their users, usually children. Such toys generally rely upon one of two common methods to produce sounds or spoken phrases. They either use electronic voice synthesis to synthesize phrases prestored in memory or they reproduce prerecorded sounds using an internal audio cassette player.

In either case, these conventional talking toys are generally limited to speaking a series of prestored phrases in a repetitive sequence selected at the time of manufacture. Because of the repetitious nature of the speech provided by the toys, children quickly lose interest in them. Further, because their speech patterns are preprogrammed during manufacture, these conventional toys are incapable of delivering messages which are

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personalized, updated, or tailored to the changing needs of their users. Consequently, the educational and entertainment value of the toys is severely limited.

Several attempts have been made to develop talking toys which have broader speech capabilities. For example, U.S Patent 4,840,602 issued to Rose on June 20, 1989 describes a talking doll which interacts with an external signal source, such as a television or VCR. The external signal source communicates a story or narrative which is prerecorded on a magnetic tape. In addition to the narrative, the tape includes binary data which is broadcast to the doll via a radio frequency transmitter. The binary data instructs the doll to make statements at certain points in the narrative, so that the doll appears to interact intelligently with the external signal source.

A similar system is disclosed in U.S. Patent 4,846,693 issued to Baer on July 11, 1989. Baer described a talking doll having a speaker which is electrically connected to a control box. The control box is connected to the audio and video outputs of a conventional video cassette recorder (VCR), which is in turn connected to a television set. The VCR receives a cassette tape having a video/audio story line recorded thereon. The tape also includes control data recorded in the video track for routing selected portions of the audio track to the doll's speaker. The illusion created to a human viewer is that the doll is having an animated conversation with characters on the television monitor.

Although the talking dolls described by Baer and Rose provide somewhat less repetitious speech patterns than those of conventional talking dolls, they cannot be programmed to deliver messages which are tailored to the needs of a user. The dolls simply speak phrases in response to speech signals which have been prerecorded on a

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cassette tape. Moreover, the dolls may only be programmed to speak new phrases by purchasing a new cassette tape.

U.S. Patent 5,607,336 issued to Lebensfeld et al. on March 4, 1997 discloses a talking doll which delivers messages relating to a user's desired area of interest. Audible messages relating to the area of interest are prerecorded on a read only memory (ROM) chip which is removably mounted in the talking doll. A user inserts the ROM chip in the doll and then activates the doll to hear the recorded messages. Although this practice provides greater speech capability, a new ROM chip must be purchased and inserted into the doll each time the user wishes to hear messages relating to a new area of interest. Moreover, Lebensfeld does not teach any mechanism for tailoring the prerecorded messages to the needs of a specific user.

OBJECTS AND ADVANTAGES OF THE INVENTION

In view of the above, it is an object of the present invention to provide a talking toy which may be programmed to deliver messages which are tailored to the needs of a user. It is another object of the invention to provide a talking toy which may be remotely programmed through a communication network, such as the Internet. It is another object of the invention to provide a talking toy including at least one control button for prompting the toy to execute a script program. It is a further object of the invention to provide a talking toy having at least one user interface means and a signaling unit; for specifying a time at which to execute a script program, and for signaling a user that a script program has been executed. It is another object of the invention to provide a talking toy capable of transmitting data and receiving data over a communication network. It is a further object of the invention to incorporate the talking toy in a networked system which allows flexible and dynamic updating of the messages delivered by the toy.

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These and other objects and advantages will become more apparent after consideration of the ensuing description and the accompanying drawings.

SUMMARY

The invention presents a networked communication system which includes at least one talking toy for communicating a message to an individual. The system also includes a server and a remote interface connected to the server for specifying the message to be communicated. The server is preferably accessible via a standard network connection such as a world wide web connection, and the remote interface is preferably a personal computer, network terminal, web TV unit, Palm Pilot unit, or interactive voice system connected to the server via the Internet. The talking toy is also connected to the server via a communication network, preferably the Internet. In contrast to conventional talking toys whose speech is programmed during manufacture or through the insertion of memory chips, the talking toy of the present invention is remotely programmed through the communication network.

The server includes a script generator for generating a script program executable by the talking toy to communicate the message to the individual. The talking toy includes a communication device, such as a modem, for establishing a communication link to the server through the communication network and for receiving the script program from the server. The talking toy also includes a memory for storing the script program and a speech synthesizer for audibly communicating the message to the individual. The talking toy further includes a microcontroller connected to the communication device, the memory, and the speech synthesizer for executing the script program. Because the talking toy is programmed remotely through the use of script programs, the system allows flexible and dynamic

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updating of the messages delivered by the toy. Further, because the messages may be specified through the remote interface, the system provides for convenient tailoring of the messages to the needs of an individual user or group of users.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a networked system according to a preferred embodiment of the invention.

FIG. 2 is a block diagram illustrating the interaction of the components of the system of FIG. 1.

FIG. 3 is a perspective view of a remotely programmable talking toy of the system of FIG. 1.

FIG. 4 is a block diagram illustrating the components of the talking toy of FIG. 3.

FIG. 5 is a script entry screen according to the preferred embodiment of the invention.

FIG. 6 is a listing of a sample script program according to the preferred embodiment of the invention.

FIG. 7 is a script assignment screen according to the preferred embodiment of the invention.

FIG. 8 is a flow chart illustrating the steps included in a software application executed by the server of FIG. 1 according to the preferred embodiment of the invention.

FIG. 9 is a flow chart illustrating the steps included in a control program executed by the talking toy of FIG. 3 according to the preferred embodiment of the invention.

FIG. 10 is a flow chart illustrating the steps included in the script program of FIG. 6.

FIG. 11 is a block diagram illustrating the interaction of the server of FIG. 1 with the talking toy of FIG. 3 according to a second embodiment of the invention.

FIG. 12 is a script entry screen according to the second embodiment of the invention.

FIG. 13 is a listing of a generic script program according to the second embodiment of the invention.

FIG. 14 is a listing of a custom script program according to the second embodiment of the invention.

FIG. 15 is a flow chart illustrating the steps included in a software application executed by the server of FIG. 1 according to the second embodiment of the invention.

FIG. 16 is a script entry screen according to an alternative embodiment of the invention.

FIG. 17 is a script entry screen according to another embodiment of the invention.

DETAILED DESCRIPTION

The invention presents a networked system which includes one or more talking toys for communicating messages to individuals. In contrast to conventional talking toys whose speech is programmed during manufacture or through the insertion of external media, the talking toys of the present invention are programmed remotely through the use of script programs. The script programs allow flexible and dynamic updating of the messages delivered by the toys, as well as convenient tailoring of the messages to the needs of the individuals.

In a preferred embodiment of the invention, the individuals are patients, and the talking toys are remotely programmed to encourage healthy behavior in the patients. For example, the talking toys may be programmed to encourage children to take their medicine or to tolerate difficult healthcare regimens. However, it is to be understood that the system of the present invention is not limited to healthcare applications. It will be apparent from the ensuing description that the system is equally well suited

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for advertising, education, entertainment, or any other application which involves the communication of messages.

The preferred embodiment of the invention is illustrated in FIGS. 1 - 7. Referring to FIG. 1, a networked system **16** includes a server **18** and a workstation **20** connected to server **18** through a communication network **24**. Server **18** is preferably accessible via a standard network connection such as a world wide web connection and communication network **24** is preferably the Internet. It will be apparent to one skilled in the art that server **18** may comprise a single stand-alone computer or multiple computers distributed throughout a network. Workstation **20** is preferably a personal computer, remote terminal, web TV unit, Palm Pilot unit, or interactive voice system connected to server **18** via the Internet. Workstation **20** functions as a remote interface for entering in server **18** the messages to be communicated to the individuals.

System **16** also includes first and second remotely programmable talking toys **26** and **28**. Each talking toy interacts with an individual in accordance with script programs received from server **18**. Each talking toy is connected to server **18** through communication network **24**, preferably the Internet. Alternatively, the talking toys may be placed in communication with server **18** via wireless communication networks, cellular networks, telephone networks, or any other network which allows each talking toy to exchange data with server **18**. For clarity of illustration, only two talking toys are shown in FIG. 1. It is to be understood that system **16** may include any number of talking toys for communicating messages to any number of individuals.

FIG. 2 shows server **18**, workstation **20**, and talking toy **26** in greater detail. Server **18** includes a database **30** for storing script programs **32**. The script programs are executed by the talking toys to communicate messages to the

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individuals. Database **30** further includes a look-up table **34**. Table **34** contains a list of the individuals who are to receive messages, and for each of the individuals, a unique identification code and a respective pointer to the script program assigned to the individual. Each talking toy is designed to execute assigned script programs which it receives from server **18**. Clock **78** (Fig. 4) enables loaded script to remain in the toy for a period of time after downloading.

FIGS. 3 - 4 show the structure of each talking toy according to the preferred embodiment. For clarity, only talking toy **26** is illustrated since each talking toy of the preferred embodiment has substantially identical structure to toy **26**. Referring to FIG. 3, toy **26** is preferably embodied as a doll, such as a teddy bear. Alternatively, toy **26** may be embodied as an action figure, robot, or any other desired toy. An action figure, robot, or other embodiment of toy **26** may have one or more moving body parts.

Toy **26** includes a modem jack **46** for connecting the toy to a telephone jack **22** through a connection cord **48**. Toy **26** also include a signaling unit **51** for signaling a user, and one or more user interface means **53**, as well as first and second user control buttons **50** and **52**. Button **50** is pressed to instruct the toy to execute a script program. Button **52** is pressed to instruct the toy to establish a communication link to the server and download a new script program. In alternative embodiments, the control buttons may be replaced, or accompanied by switches, keys, sensors, or any other type of interface suitable for receiving user input. For example, one or more user interface means **53** may be included for prompting signaling unit **51** to signal a user (e.g. a child) at a predetermined time, via clock **78**, that a message is waiting for the user.

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FIG. 4 is a schematic block diagram illustrating the internal components of toy **26**. Toy **26** includes an audio processor chip **54**, which is preferably an RSC-164 chip commercially available from Sensory Circuits Inc. of 1735 N. First Street, San Jose, California 95112. Audio processor chip **54** has a microcontroller **56** for executing script programs received from server **18**. A memory **58** is connected to microcontroller **56**. Memory **58** stores the individual's unique identification code, script programs received from server **18**, and a script interpreter used by microcontroller **56** to execute the script programs.

The script interpreter translates script commands into the native processor code of microcontroller **56**. Specific techniques for translating and executing script commands in this manner are well known in the art. Memory **58** also stores a control program executed by microcontroller **56** to perform various control functions which are described in the operation section below. Memory **58** is preferably a non-volatile memory, such as a serial EEPROM.

Toy **26** also includes a modem **85** which is connected between microcontroller **56** and modem jack **46**. Modem **85** operates under the control of microcontroller **56** to establish communication links to server **18** through the communication network and to exchange data with the server. The data includes the individual's unique identification code which modem **85** transmits to server **18**, as well as assigned script programs which modem **85** receives from server **18**. Modem **85** is preferably a complete 28.8 K modem commercially available from Cermetek Microelectronics, Inc., Sunnyvale, CA, although any suitable modem may be used.

Toy **26** further includes a speaker **64** and a microphone **66**. Audio processor chip **54** has built in speech synthesis functionality for audibly communicating messages and prompts to an individual through speaker **64**. Clock **78** (Fig. 4) allows for loaded script to remain in toy **26** for a

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specified period of time after downloading a script program. The combination of clock **78** and a signaling unit **51** enable messages to be downloaded into toy **26** (e.g. by a parent in the morning), and for toy **26** to subsequently signal a user (e.g. a child) at a later time during the day that a message is waiting. Signaling unit **51** may provide an audible and/or a visual signal, e.g., a light emitting diode, musical tones, etc. Alternatively, a signal may be provided via flashing eyes, vibration, etc., of toy **26**. According to an alternative embodiment, speech synthesis may be used to relay (audibly communicate) a signal to a user, as described hereinabove. For speech synthesis, chip **54** includes a digital to analog converter (DAC) **60** and an amplifier **62**. DAC **60** and amplifier **62** drive speaker **64** under the control of microcontroller **56** to communicate the messages and prompts.

Audio processor chip **54** also has built in speech recognition functionality for recognizing responses spoken into microphone **66**. Audio signals received through microphone **66** are converted to electrical signals and sent to a preamp and gain control circuit **68**. Circuit **68** is controlled by an automatic gain control circuit **70**, which is in turn controlled by microcontroller **56**. After being amplified by preamp **68**, the electrical signals enter chip **54** and pass through a multiplexer **72** and an analog to digital converter (ADC) **74**. The resulting digital signals pass through a digital logic circuit **76** and enter microcontroller **56** for speech recognition.

Audio processor chip **54** also includes a RAM **80** for short term memory storage and a ROM **82** which stores audio sounds for speech synthesis and programs executed by microcontroller **56** to perform speech recognition and speech synthesis. Chip **54** operates at a clock speed determined by a crystal **84**. Chip **54** further includes a clock **78** which provides the current date and time to microcontroller **56**. Microcontroller **56** is also connected to control buttons **50**

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and **52** to receive user input. Toy **26** is preferably powered by one or more batteries (not shown). Alternatively, the toy may be powered by a standard wall outlet. Both methods for supplying power to a toy are well known in the art.

Referring again to FIG. 2, server **18** includes a controlling software application **36** which is executed by server **18** to perform the various functions described below. Application **36** includes a script generator **38** and a script assignor **40**. Script generator **38** is designed to generate script programs **32** from script information entered through workstation **20**. The script information is entered through a script entry screen **42**. In the preferred embodiment, script entry screen **42** is implemented as a web page on server **18**. Workstation **20** includes a web browser for accessing the web page to enter the script information.

FIG. 5 illustrates a sample script entry screen **42** as it appears on workstation **20**. Screen **42** includes a script name field **86** for specifying the name of a script program to be generated. Screen **42** also includes entry fields **88** for entering a message, such as a set of statements or phrases, to be communicated to an individual. FIG. 5 illustrates an exemplary set of statements which encourage the individual to comply with his or her diabetes care regimen. However, it is to be understood that any type of message may be entered in screen **42**, including advertisements, educational messages, and entertainment messages. Screen **42** further includes a CREATE SCRIPT button **90** for instructing the script generator to generate a script program from the information entered in screen **42**. Screen **42** also includes a CANCEL button **92** for canceling the information entered.

In the preferred embodiment, each script program created by the script generator conforms to the standard file format used on UNIX systems. In the standard file format, each

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command is listed in the upper case and followed by a colon. Every line in the script program is terminated by a linefeed character {LF}, and only one command is placed on each line. The last character in the script program is a UNIX end of file character {EOF}. Table 1 shows an exemplary listing of script commands used in the preferred embodiment of the invention.

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TABLE 1 - SCRIPT COMMANDS

Command	Description
SPEAK: {words}{LF}	Synthesize the words following the SPEAK command.
RECOGNIZE: {word}{LF}	Recognize the word following the RECOGNIZE command.
DELAY: t {LF}	Wait a period of seconds specified by time parameter t.

The script commands illustrated in Table 1 are representative of the preferred embodiment and are not intended to limit the scope of the invention. After consideration of the ensuing description, it will be apparent to one skilled in the art many other suitable scripting languages and sets of script commands may be used to implement the invention.

Script generator **38** preferably stores a script program template which it uses to create each script program. To generate a script program, script generator **38** inserts into the template the information entered in screen **42**. For example, FIG. 6 illustrates a sample script program created by the script generator from the script information shown in FIG. 5. The script program includes speech commands to synthesize the phrases or statements entered in fields **88**. The steps included in the script program are also shown in the flow chart of FIG. 10 and will be discussed in the operation section below.

Referring again to FIG. 2, script assignor **40** is for assigning script programs **32** to the individuals. Script programs **32** are assigned in accordance with script assignment information entered through workstation **20**. The script assignment information is entered through a script assignment screen **44**, which is preferably implemented as a web page on server **18**.

FIG. 7 illustrates a sample script assignment screen **44** as it appears on workstation **20**. Screen **44** includes check

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boxes **94** for selecting a script program to be assigned and check boxes **96** for selecting the individuals to whom the script program is to be assigned. Screen **44** also includes an ASSIGN SCRIPT button **100** for entering the assignments. When button **100** is pressed, the script assignor creates and stores for each individual selected in check boxes **96** a respective pointer to the script program selected in check boxes **94**. Each pointer is stored in look-up table **34** of database **30**. Screen **44** further includes an ADD SCRIPT button **98** for adding a new script program and a DELETE SCRIPT button **102** for deleting a script program.

The operation of the preferred embodiment is illustrated in FIGS. 1 - 10. FIG. 8 is a flow chart illustrating the steps included in the software application executed by server **18**. In step **202**, server **18** determines if new script information has been entered through script entry screen **42**. If new script information has not been entered, server **18** proceeds to step **206**. If new script information has been entered, server **18** proceeds to step **204**.

In the preferred embodiment, the script information is entered in server **18** by one or more healthcare providers, such as a physician or case manager assigned to the individuals. Of course, any person desiring to communicate with the individuals may be granted access to server **18** to create and assign script programs. Further, it is to be understood that the system may include any number of remote interfaces for entering script generation and script assignment information in server **18**.

As shown in FIG. 5, the script information specifies a message, such as a set of statements or phrases, to be communicated to one or more individuals. In step **204**, script generator **38** generates a script program from the information entered in screen **42**. The script program is stored in database **30**. Steps **202** and **204** are preferably repeated to generate multiple script programs, e.g. a

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script program for diabetes patients, a script program for asthma patients, etc. Each script program corresponds to a respective one of the sets of statements entered through script entry screen **42**.

In step **206**, server **18** determines if new script assignment information has been entered through assignment screen **44**. If new script assignment information has not been entered, server **18** proceeds to step **210**. If new script assignment information has been entered, server **18** proceeds to step **208**. As shown in FIG. 7, the script assignment information is entered by selecting a desired script program through check boxes **94**, selecting the individuals to whom the selected script program is to be assigned through check boxes **96**, and pressing the ASSIGN SCRIPT button **100**. When button **100** is pressed, script assignor **40** creates for each individual selected in check boxes **96** a respective pointer to the script program selected in check boxes **94**. In step **208**, each pointer is stored in look-up table **34** of database **30**.

In step **210**, server **18** determines if any one of the talking toys is remotely connected to the server. Each individual is preferably provided with his or her own talking toy which has the individual's unique identification code stored therein. Each individual is thus uniquely associated with a respective one of the talking toys. If none of the talking toys is connected, server **18** returns to step **202**. If a talking toy is connected, server **18** receives from the talking toy the individual's unique identification code in step **212**. Server **18** uses the received identification code to retrieve from table **34** the pointer to the script program assigned to the individual. In step **214**, server **18** retrieves the assigned script program from database **30**. In step **216**, server **18** transmits the assigned script program to the individual's talking toy through communication network **24**. Following step **216**, the server returns to step **202**.

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Each talking toy is initially programmed with its user's unique identification code, the script interpreter used by the toy to interpret and execute script program commands, and a control program executed by the toy to control its overall operation. The initial programming may be achieved during manufacture or during an initial connection to server **18**.

FIG. 9 illustrates the steps included in the control program executed by microcontroller **56** of talking toy **26**. In step **302**, microcontroller **56** determines if any user input has been received. In the preferred embodiment, user input is received through control buttons **50** and **52**. Control button **50** is pressed to instruct the talking toy to speak, and control button **52** is pressed to instruct the toy to connect to the server and download a new script program. If no user input is received for a predetermined period of time, such as two minutes, toy **26** enters sleep mode in step **304**. The sleep mode conserves battery power while the toy is not in use. Following step **304**, microcontroller **56** returns to step **302** and awaits user input.

If user input has been received, microcontroller **56** determines if the input is a speech request, step **306**. If the user has pressed control button **50** requesting speech, microcontroller **56** executes the script program last received from the server, step **308**. The steps included in a sample script program are shown in the flow chart of FIG. 10 and will be discussed below. Following step **308**, microcontroller **56** returns to step **302** and awaits new user input.

If the user presses control button **52** requesting a connection to the server, microcontroller **56** attempts to establish a communication link to the server through modem **85** and communication network **24**, step **310**. In step **312**, microcontroller determines if the connection was

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successful. If the connection failed, the user is prompted to connect toy **26** to telephone jack **22** in step **314**. Microcontroller **56** preferably prompts the user by synthesizing the phrase "PLEASE CONNECT ME TO THE TELEPHONE JACK USING THE CONNECTION CORD AND SAY 'DONE' WHEN YOU HAVE FINISHED." In step **316**, microcontroller **56** waits until the appropriate reply is received through microphone **66**. Upon recognizing the reply 'DONE', microcontroller **56** repeats step **310** to get a successful connection to the server.

Once a successful connection is established, microcontroller **56** transmits the unique identification code stored in memory **58** to server **18** in step **318**. In step **320**, microcontroller **56** receives a new script program from the server through communication network **24** and modem **85**. The new script program is stored in memory **58** for subsequent execution by microcontroller **56**. Following step **320**, microcontroller **56** returns to step **302** and awaits new user input.

FIG. 10 is a flow chart illustrating the steps included in a sample script program executed by microcontroller **56**. In step **402**, microcontroller **56** prompts the user by synthesizing through speaker **64** "SAY 'OK' WHEN YOU ARE READY". In step **404**, microcontroller **56** waits until a reply to the prompt is received through microphone **66**. When the reply 'OK' is recognized, microcontroller **56** proceeds to step **406**. If no reply is received within a predetermined period of time, such as two minutes, toy **26** preferably enters sleep mode until it is reactivated by pressing one the control buttons.

In step **406**, microcontroller **56** executes successive speech commands to synthesize through speaker **64** the phrases or statements specified in the script program. Referring again to FIG. 6, the speech commands are preferably separated by delay commands which instruct microcontroller

56 to pause for a number of seconds between statements. The number of seconds is selected to allow the user sufficient time to absorb each statement. Alternatively, the user may be prompted to acknowledge each statement before a subsequent statement is synthesized. For example, the script program may include commands which instruct microcontroller 56 to synthesize the phrase "SAY 'OK' WHEN YOU ARE READY TO HEAR THE NEXT STATEMENT." Upon recognizing the reply 'OK', microcontroller 56 proceeds to the next speech command in the script program.

In step 408, the user is reminded to connect toy 26 to telephone jack 22 to download a new script program. Microcontroller 56 synthesizes through speaker 64 "PLEASE CONNECT ME TO THE TELEPHONE JACK TO GET NEW MESSAGES." Following step 408, the script program ends.

One advantage of the system of the present invention is that it allows each talking toy to be programmed remotely through the use of script programs. This allows the messages delivered by each talking toy to be tailored to the specific needs of an individual user or group of users. Moreover, each script program may be easily created, assigned, and downloaded by simply accessing a server through a communication network, such as the Internet. Thus, the invention provides a powerful, convenient, and inexpensive system for communicating messages to a large number of individuals.

FIGS. 11 - 15 illustrate a second embodiment of the invention in which messages are further customized to each individual by merging personal data with the script programs, much like a standard mail merge application. Referring to FIG. 11, personal data relating to each individual is preferably stored in look-up table 34 of database 30. By way of example, the data may include each individual's name, the name of each individual's medication or disease, or any other desired data. As in the preferred

embodiment, database **30** also stores generic script programs **31** created by script generator **38**.

In the second embodiment, server **18** includes a data merge program **41** for merging the data stored in table **34** with generic script programs **31**. Data merge program **41** is designed to retrieve selected data from table **34** and to insert the data into statements in generic script programs **31**, thus creating custom script programs **33**. Each custom script program contains a message which is customized to an individual. For example, the message may be customized with the individual's name, medication name, disease name, etc.

The operation of the second embodiment is illustrated in FIGS. 11 - 15. The operation of the second embodiment is similar to the operation of the preferred embodiment except that server **18** transmits custom script programs to each talking toy rather than generic script programs. FIG. 15 is a flow chart illustrating the steps included in a software application executed by server **18** according to the second embodiment.

In step **502**, server **18** determines if new script information has been entered through script entry screen **42**. If new script information has not been entered, server **18** proceeds to step **506**. If new script information has been entered, server **18** proceeds to step **504**. As shown in FIG. 12, the script information specifies a message, such as a set of statements or phrases, to be communicated to the individuals. Each statement preferably includes one or more insert commands specifying data from table **34** to be inserted into the statement. The insert commands instruct data merge program **41** to retrieve the specified data from database **30** and to insert the data into the statement. For example, the first statement shown in FIG. 12 includes insert commands instructing the data merge program to

insert a patient name and a medication name into the statement.

Following entry of the statements and insert commands, CREATE SCRIPT button **90** is pressed. When button **90** is pressed, script generator **38** generates a generic script program from the information entered in screen **42**, step **504**. A sample generic script program is illustrated in FIG. 13. The generic script program includes speech commands to synthesize the statements entered in fields **88**. Each statement preferably includes one or more insert commands specifying data to be inserted into the script program. The generic script program is stored in database **30**.

In step **506**, server **18** determines if new script assignment information has been entered through assignment screen **44**. If new script assignment information has not been entered, server **18** proceeds to step **512**. If new script assignment information has been entered, server **18** proceeds to step **508**. As shown in FIG. 7, the script assignment information is entered by selecting a desired script program through check boxes **94**, selecting the individuals to whom the selected script program is to be assigned through check boxes **96**, and pressing the ASSIGN SCRIPT button **100**.

When button **100** is pressed, data merge program **41** creates a custom script program for each individual selected in check boxes **96**, step **508**. Each custom script program is preferably created by using the selected generic script program as a template. For each individual selected, data merge program **41** retrieves from database **30** the data specified in the insert commands. Next, data merge program **41** inserts the data into the appropriate statements in the generic script program to create a custom script program for the individual. For example, FIG. 14 illustrates a custom script program created from the generic script

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program of FIG. 13. Each custom script program is stored in database **30**.

As each custom script program is generated for an individual, script assignor **40** assigns the custom script program to the individual, step **510**. This is preferably accomplished by creating a pointer to the custom script program and storing the pointer with the individual's unique identification code in table **34**. In step **512**, server **18** determines if any one of the talking toys is remotely connected to the server. If a talking toy is connected, server **18** receives from the talking toy the individual's unique identification code in step **514**.

Server **18** uses the received identification code to retrieve from table **34** the pointer to the custom script program assigned to the individual. In step **516**, server **18** retrieves the custom script program from database **30**. In step **518**, server **18** transmits the custom script program to the individual's talking toy. The talking toy receives and executes the script program in the same manner described in the preferred embodiment. The remaining operation of the second embodiment is analogous to the operation of the preferred embodiment described above.

Although it is presently preferred to generate a custom script program for each individual as soon as script assignment information is received for the individual, it is also possible to wait until the individual's talking toy connects to the server before generating the custom script program. This is accomplished by creating and storing a pointer to the generic script program assigned to the individual, as previously described in the preferred embodiment. When the individual's talking toy connects to the server, the data merge program creates a custom script program for the individual from the generic script program assigned to the individual. The custom script program is

then transmitted to the individual's talking toy for execution.

Although the first and second embodiments focus on healthcare applications, the system of the present invention may be used for any messaging application. For example, the system is particularly well suited for advertising. In a third embodiment of the invention, an advertising service is provided with a remote interface to the server for creating and assigning script programs which contain advertising messages. As shown in FIG. 16, each advertising message may be conveniently entered through script entry screen **42**, like the health-related messages of the preferred embodiment. The operation of the third embodiment is analogous to the operation of the preferred embodiment, except that the talking toys communicate advertising messages rather than health-related messages.

Of course, the system of the present invention has many other applications. Typically, the user of each talking toy is a child. In a fourth embodiment of the invention, the child's parent or guardian is provided with a remote interface to the server for creating and assigning script programs which contain messages for the child. As shown in FIG. 17, each message may be conveniently entered through script entry screen **42**. The operation of the fourth embodiment is analogous to the operation of the preferred embodiment, except that script information is entered in the server by a parent or guardian rather than a healthcare provider. Alternatively, the child may be provided with a remote interface to the server to create and assign his or her own script programs.

It should also be noted that script programs may be generated from information received from multiple sources, such as a healthcare provider, an advertiser, and a parent. In a fifth embodiment of the invention, the script entry screen includes a respective section for each of the

sources to enter a message to be communicated. Each of the sources is provided with a remote interface to the server and a password for accessing the script entry screen. After each source has entered one or more messages in the server, a script program is generated which contains a combination of health-related messages, advertisements, educational messages, or entertainment messages. The remaining operation of the fifth embodiment is analogous to the operation of the preferred embodiment described above.

SUMMARY, RAMIFICATIONS, AND SCOPE

Although the above description contains many specificities, these should not be construed as limitations on the scope of the invention but merely as illustrations of some of the presently preferred embodiments. Many other embodiments of the invention are possible. For example, the scripting language and script commands shown are representative of the preferred embodiment. It will be apparent to one skilled in the art many other scripting languages and specific script commands may be used to implement the invention.

Moreover, the talking toys of the present invention need not be embodied as dolls. The toys may be embodied as action figures, robots, or any other type of toy. Further, each talking toy need not include a control button for triggering speech output. In alternative embodiments, speech is triggered by other mechanisms, such as voice prompts, the absence of the user's voice, position sensitive sensors, switches, or the like. Specific techniques for triggering speech in a talking toy are well known in the art.

In addition, the system of the present invention is not limited to healthcare applications. The system may be used in any application which involves the communication of messages, including advertising, education, or

entertainment. Of course, various combinations of these applications are also possible. For example, messages from multiple sources may be combined to generate script programs which contain a combination of health-related messages, advertisements, or educational messages. Further, the system may include any number of remote interfaces for entering and assigning script programs, and any number of talking toys for delivering messages.

Therefore, the scope of the invention should be determined not by the examples given, but by the appended claims and their legal equivalents.

CLAIMS

What is claimed is:

1. A remotely programmable talking toy comprising:
   a) communication means for establishing a communication link to a server through a communication network and for receiving from the server a script program executable by the toy to communicate a message to an individual;
   b) speech synthesis means for communicating the message to the individual;
   c) memory means for storing the script program; and
   d) control means connected to the communication means, the speech synthesis means, and the memory means for executing the script program.

2. The talking toy of claim 1, wherein the communication means comprises a modem for establishing the communication link to the server via the Internet.

3. The talking toy of claim 1, wherein the speech synthesis means includes means for prompting the individual, and wherein the talking toy further includes speech recognition means connected to the control means for recognizing responses spoken by the individual.

4. The talking toy of claim 1, wherein the talking toy comprises a doll, an action figure, or a robot.

5. A system for communicating information to an individual, the system comprising:
   a) a server;
   b) a remote interface connected to the server for specifying a message to be communicated to the individual; and

c) a remotely programmable talking toy for communicating the message to the individual, the talking toy being networked to the server via a communication network;

wherein the server includes a script generating means for generating a script program executable by the talking toy to communicate the message to the individual;

and wherein the talking toy comprises:

i) a communication means for receiving the script program from the server through the communication network;

ii) a speech synthesis means for communicating the message to the individual;

iii) a memory means for storing the script program; and

iv) a control means connected to the communication means, the speech synthesis means, and the memory means for executing the script program.

6. The system of claim 5, wherein the server further includes database means connected to the script generating means for storing data relating to the individual, and wherein the script generating means includes means for inserting the data into the script program to customize the message to the individual.

7. The system of claim 5, wherein the server comprises a web server having a web page for entry of the message, and wherein the remote interface is connected to the web server via the Internet.

8. The system of claim 5, wherein the communication means of the talking toy comprises a modem for establishing the communication link to the server via the Internet.

9. The system of claim 5, wherein the speech synthesis means of the talking toy includes means for prompting the individual, and wherein the talking toy further

includes speech recognition means connected to the control means for recognizing responses spoken by the individual.

10. The system of claim 5, wherein the talking toy comprises a doll, an action figure, or a robot.

11. The system of claim 5, further comprising a plurality of remotely programmable talking toys networked to the server for communicating information to a corresponding plurality of individuals, wherein the server includes database means for storing a plurality of script programs, the remote interface includes means for entering in the server script assignment information, the server includes script assignment means connected to the database means for assigning to each of the plurality of individuals at least one of the plurality of script programs in accordance with the script assignment information, and the database means further includes means for storing a list of the plurality of individuals, and for each of the plurality of individuals, a respective pointer to the at least one of the plurality of script programs assigned to each of the plurality of individuals.

12. A method for communicating information to an individual, comprising the steps of:

a) providing the individual with a talking toy comprising:

i) a communication means for establishing a communication link to a server through a communication network and for receiving from the server a script program executable by the toy to communicate a message to the individual;

ii) a speech synthesis means for communicating the message to the individual;

iii) a memory means for storing the script program; and

iv) a control means connected to the communication means, the speech synthesis means, and the memory means for executing the script program;

b) specifying in the server the message to be communicated to the individual;

c) generating the script program in the server;

d) transmitting the script program from the server to the talking toy through the communication network; and

e) executing the script program in the talking toy to communicate the message to the individual.

13. The method of claim 12, wherein the step of transmitting the script program from the server to the talking toy is preceded by the steps of:

f) storing in the server data relating to the individual; and

g) inserting the data into the script program to customize the message to the individual.

14. The method of claim 12, wherein the server comprises a web server having a web page for entry of the message, and wherein the message is specified in the server by accessing the web page through the Internet and entering the message in the web page.

15. The method of claim 12, wherein the step of transmitting the script program from the server to the talking toy comprises establishing a communication link between the server and the talking toy through the Internet and transmitting the script program through the communication link.

16. The method of claim 12, wherein the talking toy comprises a doll, an action figure, or a robot.

17. The method of claim 12, further comprising the steps of:

a) providing a plurality of individuals with a corresponding plurality of talking toys such that each of the plurality of individuals is associated with a respective one of the plurality of talking toys;

b) generating in the server a plurality of script programs;

c) assigning to each of the plurality of individuals at least one of the plurality of script programs;

d) storing in the server the plurality of script programs, a list of the plurality of individuals, and for each of the plurality of individuals, a respective pointer to the at least one of the plurality of script programs assigned to each of the plurality of individuals; and

e) transmitting to each of the plurality of talking toys the at least one of the plurality of script programs assigned to each of the plurality of individuals associated with the respective plurality of talking toys.

18. The talking toy of claim 1, further comprising a clock and a signaling unit, wherein the script program received by the talking toy from said server is stored in said memory means for subsequent execution by said control means, and said signaling unit is adapted for signaling a user when the script program is executed by said control means.

19. The talking toy of claim 18, further comprising a user interface means, wherein said user interface means is adapted to specify a time at which a script program is executed by said control means, and said signaling unit signals the user at a time when the script program is executed by said control means.

20. The talking toy of claim 1, further comprising first and second control buttons, wherein said first control button is adapted for instructing the toy to execute a script program, and said second control button is adapted to initiate establishment of a communication link between the talking toy and said server.

21. The talking toy of claim 18, wherein said signaling unit comprises a light emitting diode, flashing eyes, a vibration means, or speech synthesis.

22. The talking toy of claim 1, wherein the talking toy is capable of transmitting data and receiving data over a communication network via said communication means.

23. The talking toy of claim 1, wherein the talking toy transmits user identification code data to said server via said communication means.

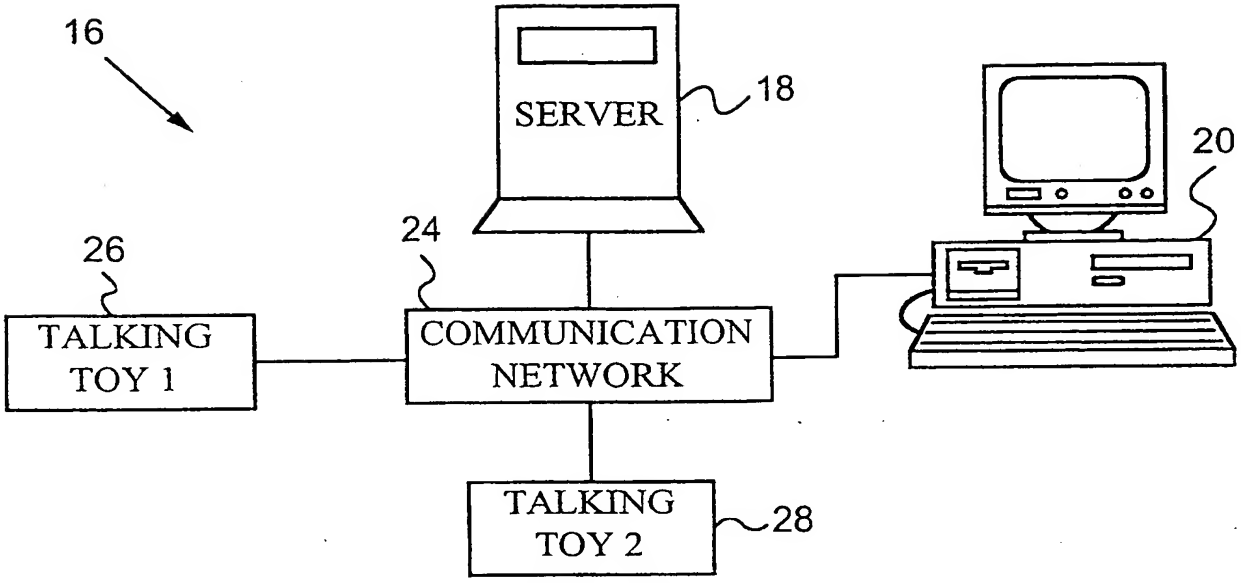
16
SERVER
18
20
24
26
TALKING TOY 1
COMMUNICATION NETWORK
TALKING TOY 2
28

FIG. 1

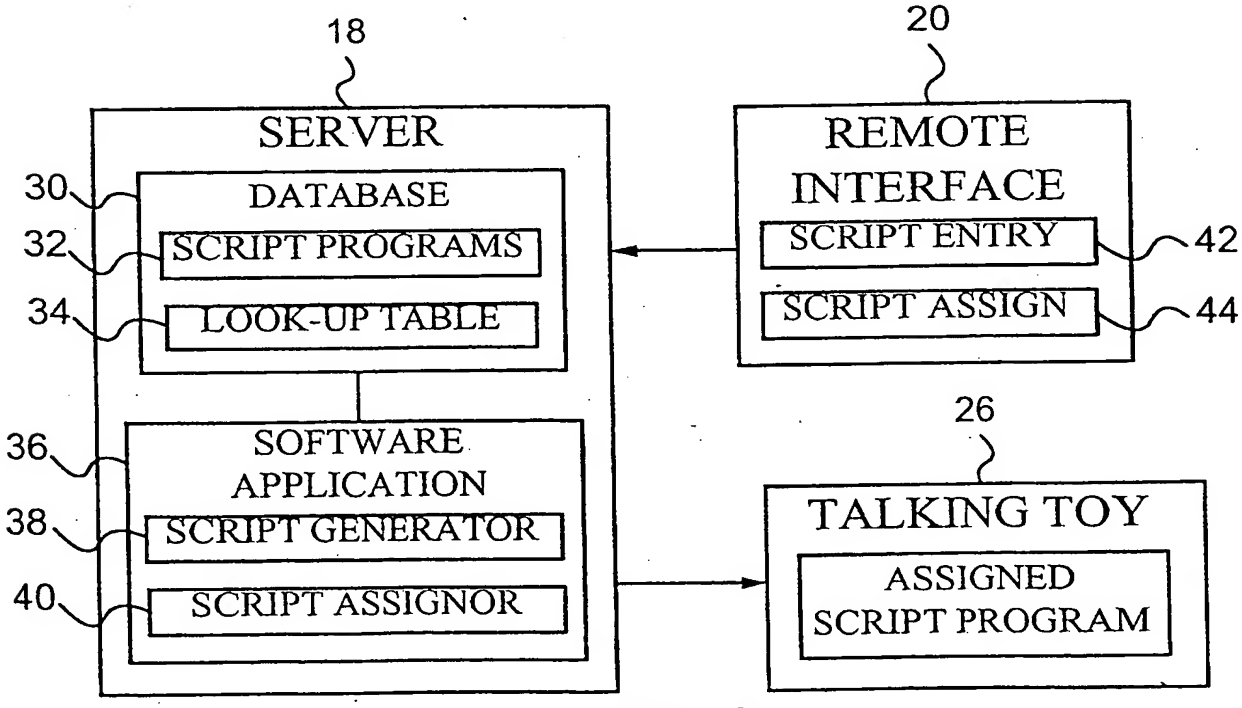
18
SERVER
30
DATABASE
32
SCRIPT PROGRAMS
34
LOOK-UP TABLE
36
SOFTWARE APPLICATION
38
SCRIPT GENERATOR
40
SCRIPT ASSIGNOR
20
REMOTE INTERFACE
SCRIPT ENTRY
42
SCRIPT ASSIGN
44
26
TALKING TOY
ASSIGNED SCRIPT PROGRAM

FIG. 2

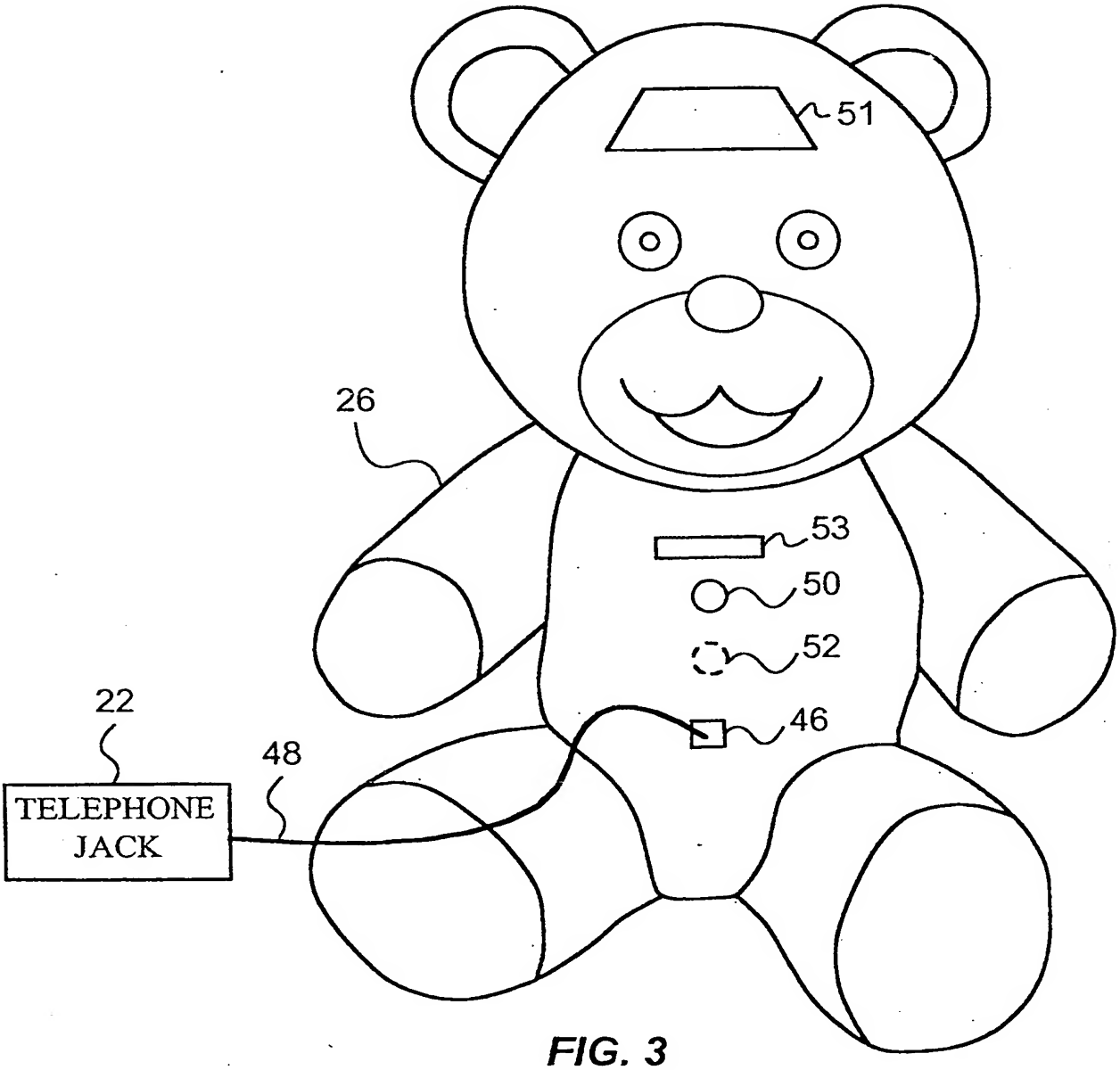

FIG. 3

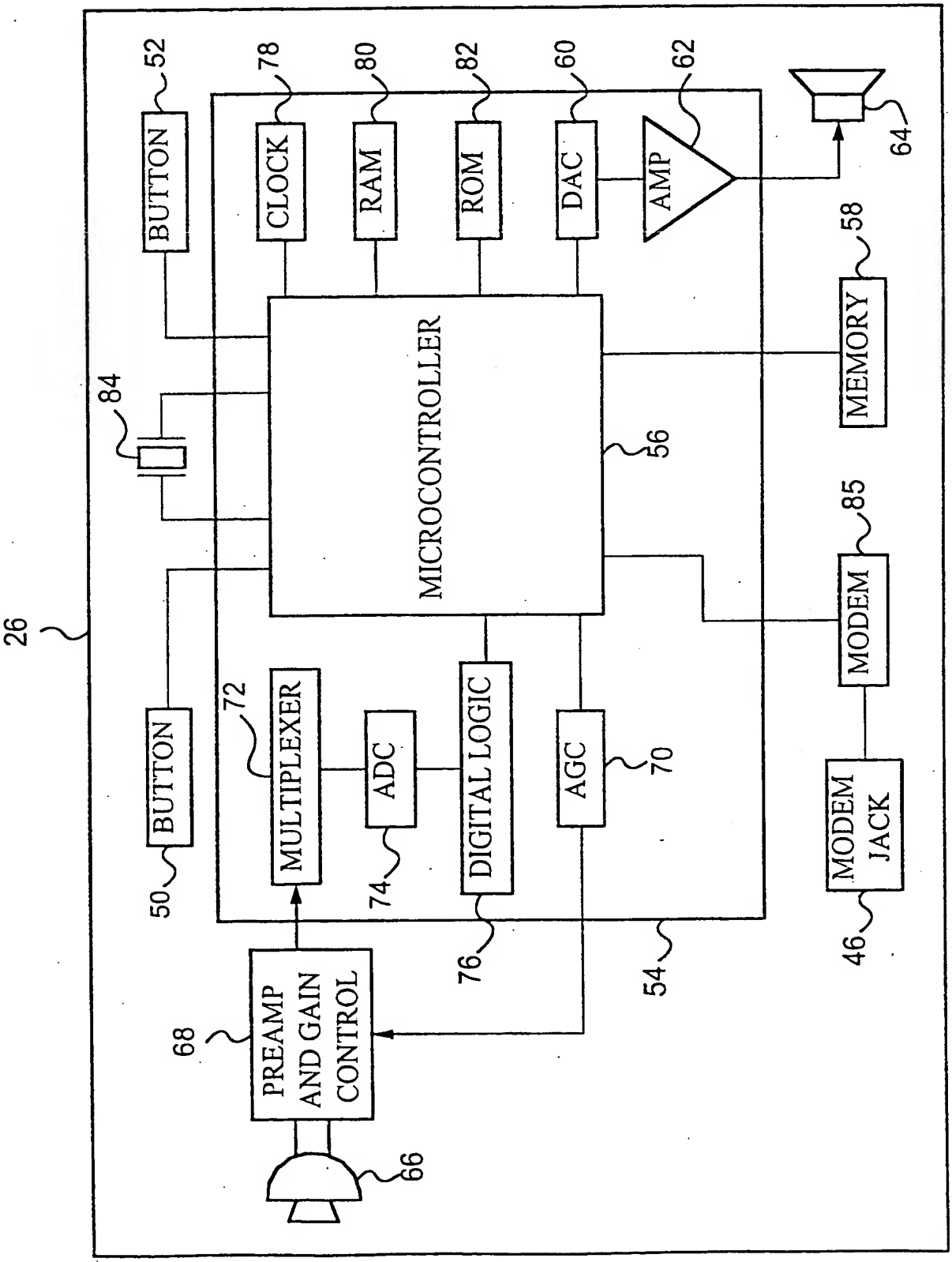

FIG. 4

EDOCID: <WO 9917854A1 >

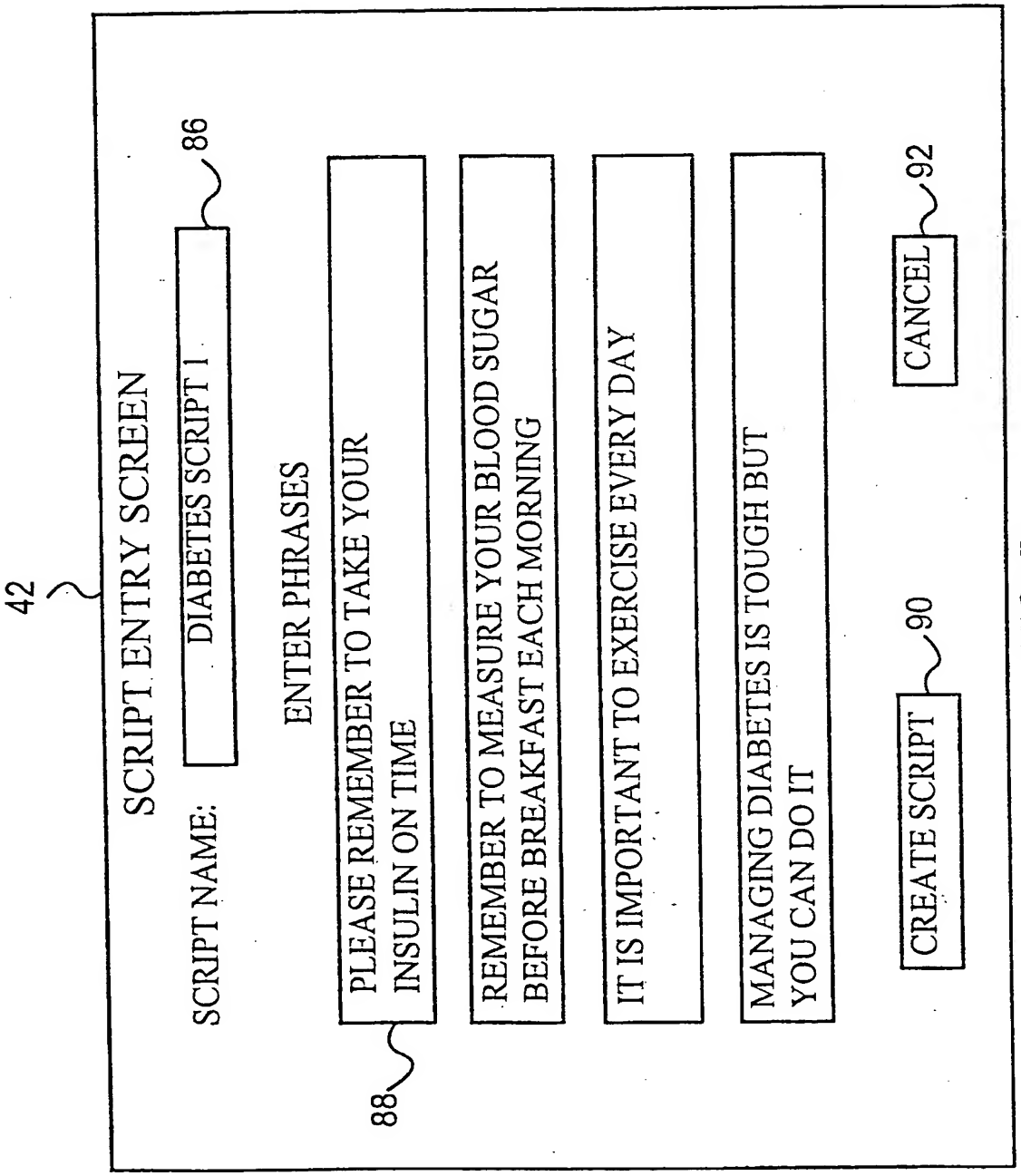
42
SCRIPT ENTRY SCREEN
SCRIPT NAME:
DIABETES SCRIPT 1
86
ENTER PHRASES
PLEASE REMEMBER TO TAKE YOUR INSULIN ON TIME
88
REMEMBER TO MEASURE YOUR BLOOD SUGAR BEFORE BREAKFAST EACH MORNING
IT IS IMPORTANT TO EXERCISE EVERY DAY
MANAGING DIABETES IS TOUGH BUT YOU CAN DO IT
CREATE SCRIPT
90
CANCEL
92

FIG. 5

```
SPEAK: SAY OK WHEN YOU ARE READY {LF}
RECOGNIZE: OK {LF}
SPEAK: PLEASE REMEMBER TO TAKE YOUR
       INSULIN ON TIME {LF}
DELAY: 3 {LF}
SPEAK: REMEMBER TO MEASURE YOUR BLOOD SUGAR
       BEFORE BREAKFAST EACH MORNING {LF}
DELAY: 3 {LF}
SPEAK: IT IS IMPORTANT TO EXERCISE EVERY DAY {LF}
DELAY: 3 {LF}
SPEAK: MANAGING DIABETES IS TOUGH BUT
       YOU CAN DO IT {LF}
DELAY: 3 {LF}
SPEAK: THAT'S ALL THE NEWS FOR NOW {LF}
DELAY: 1{LF}
SPEAK: CONNECT ME TO THE TELEPHONE LINE
       TO GET NEW MESSAGES {LF}
{EOF}
```

FIG. 6

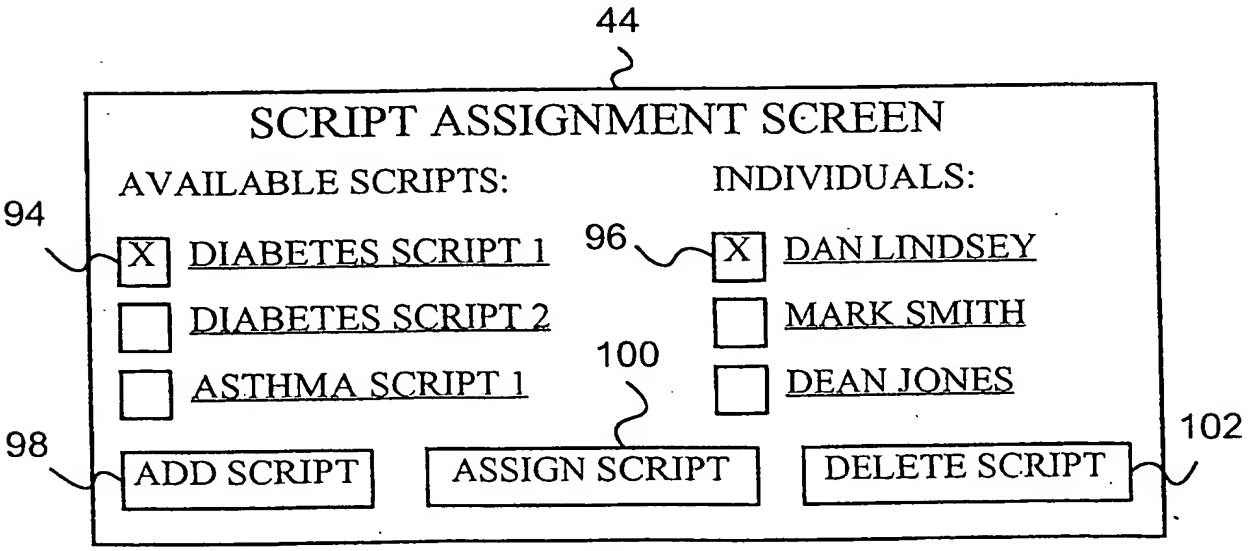

FIG. 7

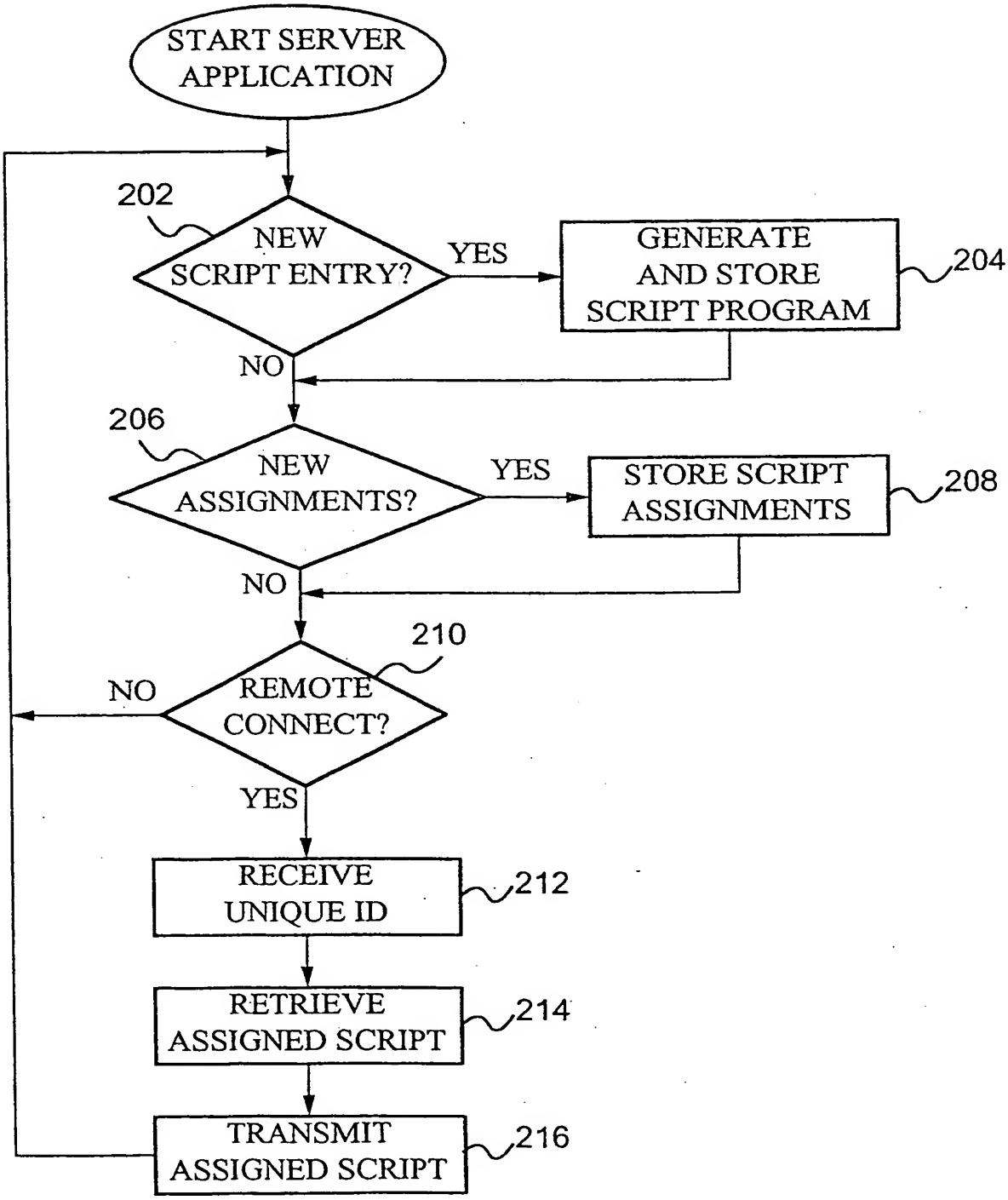
START SERVER APPLICATION
202
NEW SCRIPT ENTRY?
YES
GENERATE AND STORE SCRIPT PROGRAM
204
NO
206
NEW ASSIGNMENTS?
YES
STORE SCRIPT ASSIGNMENTS
208
NO
210
NO
REMOTE CONNECT?
YES
RECEIVE UNIQUE ID
212
RETRIEVE ASSIGNED SCRIPT
214
TRANSMIT ASSIGNED SCRIPT
216

FIG. 8

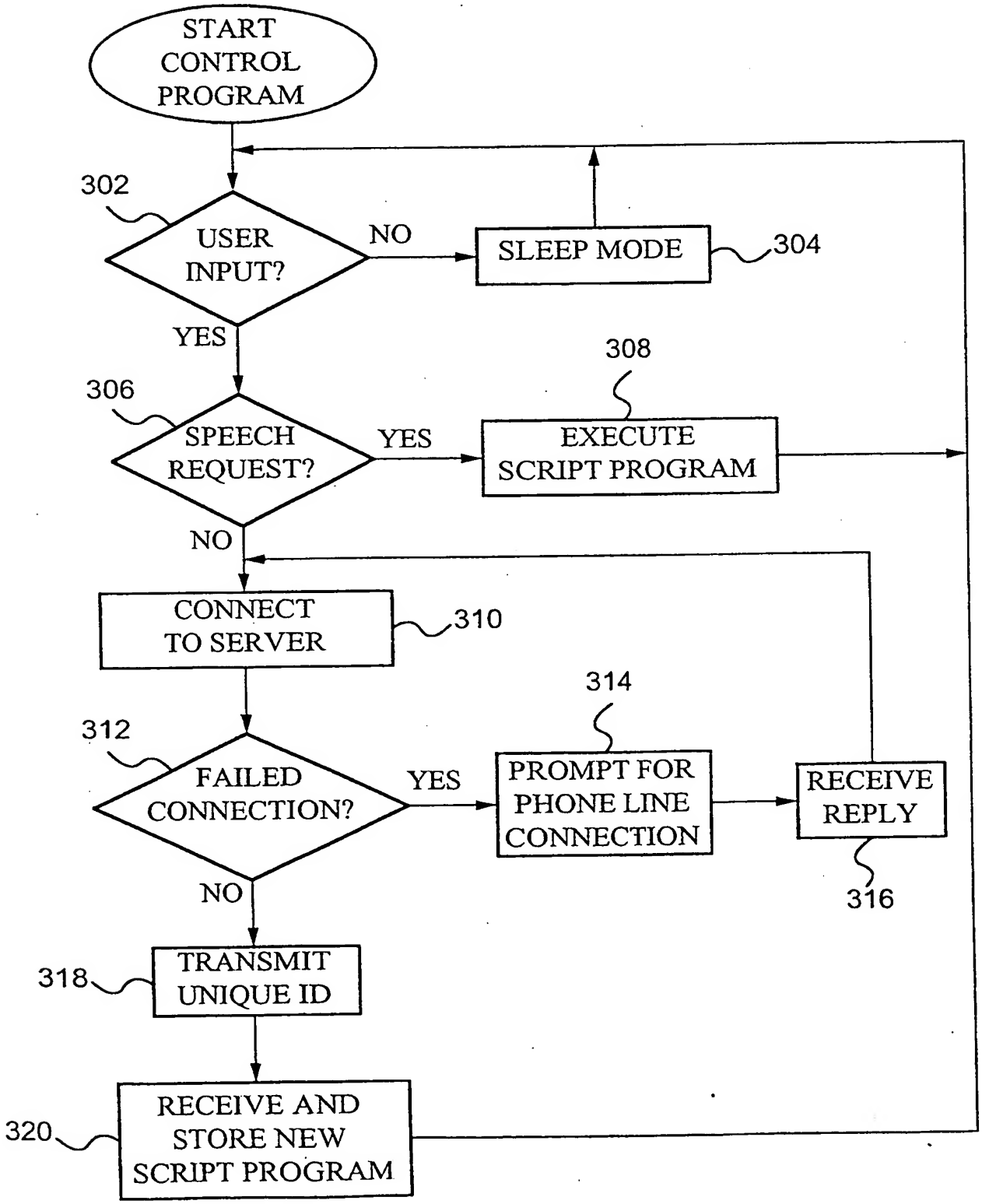
START CONTROL PROGRAM
302
USER INPUT?
NO
SLEEP MODE
304
YES
306
SPEECH REQUEST?
YES
308
EXECUTE SCRIPT PROGRAM
NO
CONNECT TO SERVER
310
312
FAILED CONNECTION?
YES
314
PROMPT FOR PHONE LINE CONNECTION
RECEIVE REPLY
316
NO
318
TRANSMIT UNIQUE ID
320
RECEIVE AND STORE NEW SCRIPT PROGRAM

FIG. 9

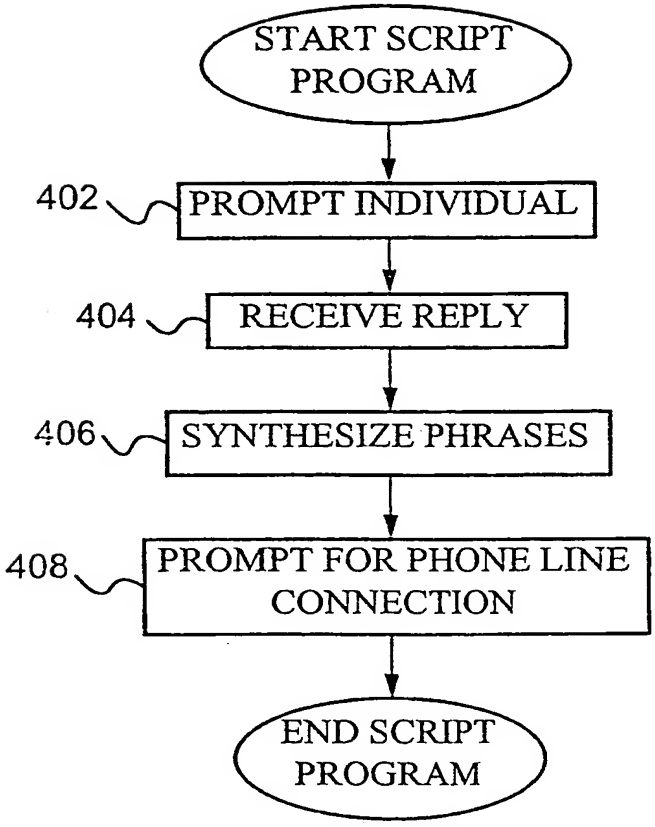
START SCRIPT PROGRAM
402
PROMPT INDIVIDUAL
404
RECEIVE REPLY
406
SYNTHESIZE PHRASES
408
PROMPT FOR PHONE LINE CONNECTION
END SCRIPT PROGRAM

FIG. 10

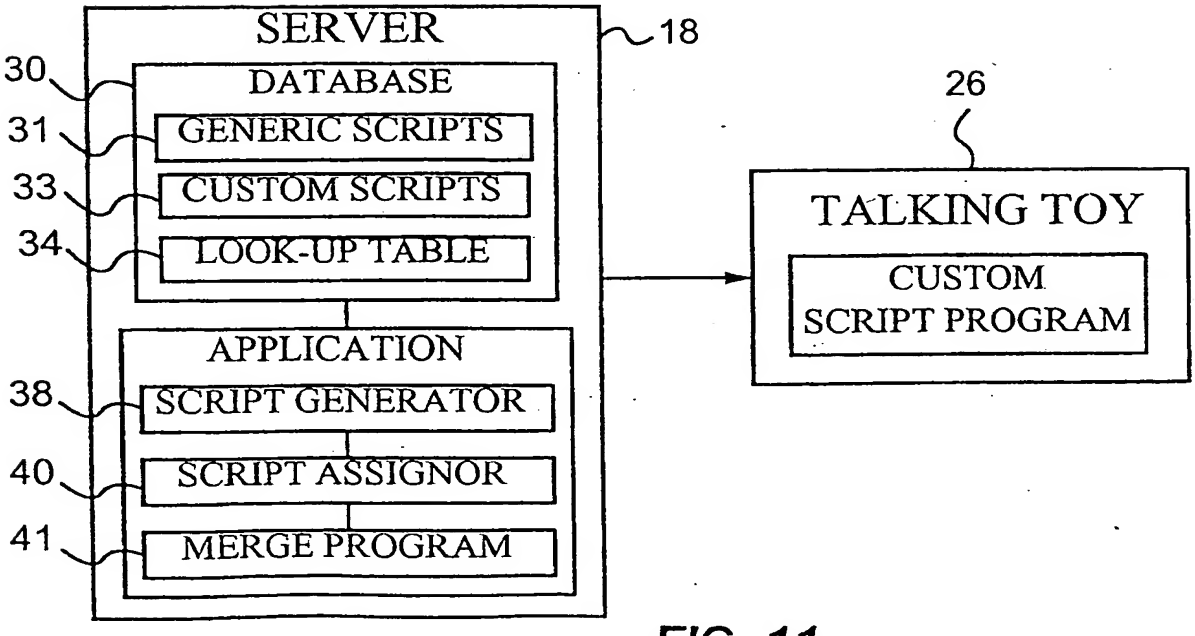
SERVER
18
30
DATABASE
31
GENERIC SCRIPTS
33
CUSTOM SCRIPTS
34
LOOK-UP TABLE
APPLICATION
38
SCRIPT GENERATOR
40
SCRIPT ASSIGNOR
41
MERGE PROGRAM
26
TALKING TOY
CUSTOM SCRIPT PROGRAM

FIG. 11

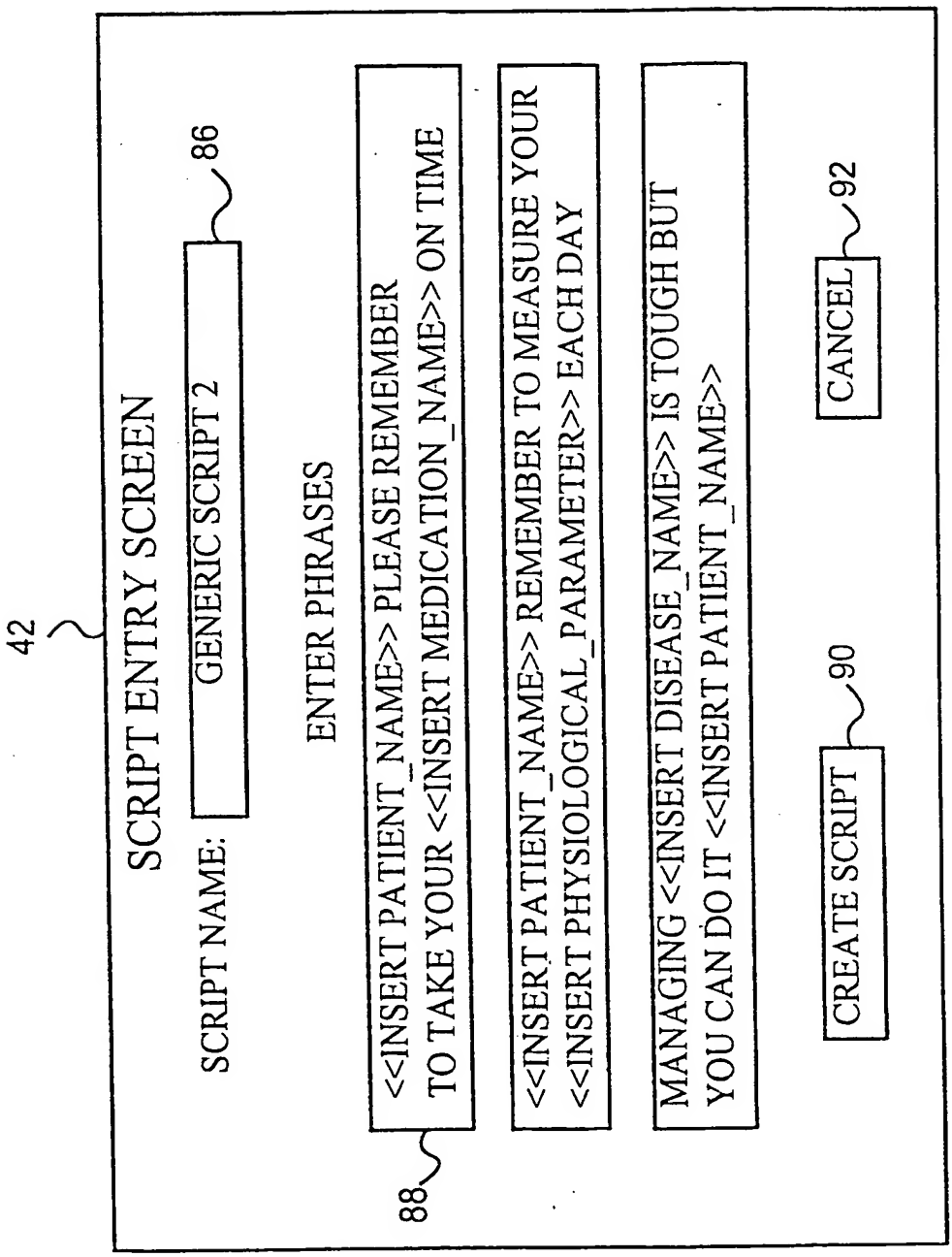
42
SCRIPT ENTRY SCREEN
SCRIPT NAME:
GENERIC SCRIPT 2
86
ENTER PHRASES
<<INSERT PATIENT_NAME>> PLEASE REMEMBER TO TAKE YOUR <<INSERT MEDICATION_NAME>> ON TIME
88
<<INSERT PATIENT_NAME>> REMEMBER TO MEASURE YOUR <<INSERT PHYSIOLOGICAL_PARAMETER>> EACH DAY
MANAGING <<INSERT DISEASE_NAME>> IS TOUGH BUT YOU CAN DO IT <<INSERT PATIENT_NAME>>
CREATE SCRIPT
90
CANCEL
92

FIG. 12

SPEAK: SAY OK WHEN YOU ARE READY {LF}
RECOGNIZE: OK {LF}
SPEAK: <<INSERT PATIENT_NAME>> PLEASE REMEMBER TO TAKE
YOUR <<INSERT MEDICATION_NAME>> ON TIME {LF}
DELAY: 3 {LF}
SPEAK: <<INSERT PATIENT_NAME>> REMEMBER TO MEASURE YOUR
<<INSERT MEASURED_PARAMETER>> EACH DAY {LF}
DELAY: 3 {LF}
SPEAK: MANAGING <<INSERT DISEASE_NAME>> IS TOUGH
BUT YOU CAN DO IT <<INSERT PATIENT_NAME>> {LF}
DELAY: 3 {LF}
SPEAK: THAT'S ALL THE NEWS FOR NOW {LF}
DELAY: 1{LF}
SPEAK: CONNECT ME TO THE TELEPHONE LINE
TO GET NEW MESSAGES {LF}
{EOF}

FIG. 13

SPEAK: SAY OK WHEN YOU ARE READY {LF}
RECOGNIZE: OK {LF}
SPEAK: DAN PLEASE REMEMBER TO TAKE
YOUR INSULIN ON TIME {LF}
DELAY: 3 {LF}
SPEAK: DAN REMEMBER TO MEASURE YOUR
BLOOD SUGAR EACH DAY {LF}
DELAY: 3 {LF}
SPEAK: MANAGING DIABETES IS TOUGH
BUT YOU CAN DO IT DAN {LF}
DELAY: 3 {LF}
SPEAK: THAT'S ALL THE NEWS FOR NOW {LF}
DELAY: 1 {LF}
SPEAK: CONNECT ME TO THE TELEPHONE LINE
TO GET NEW MESSAGES {LF}
{EOF}

FIG. 14

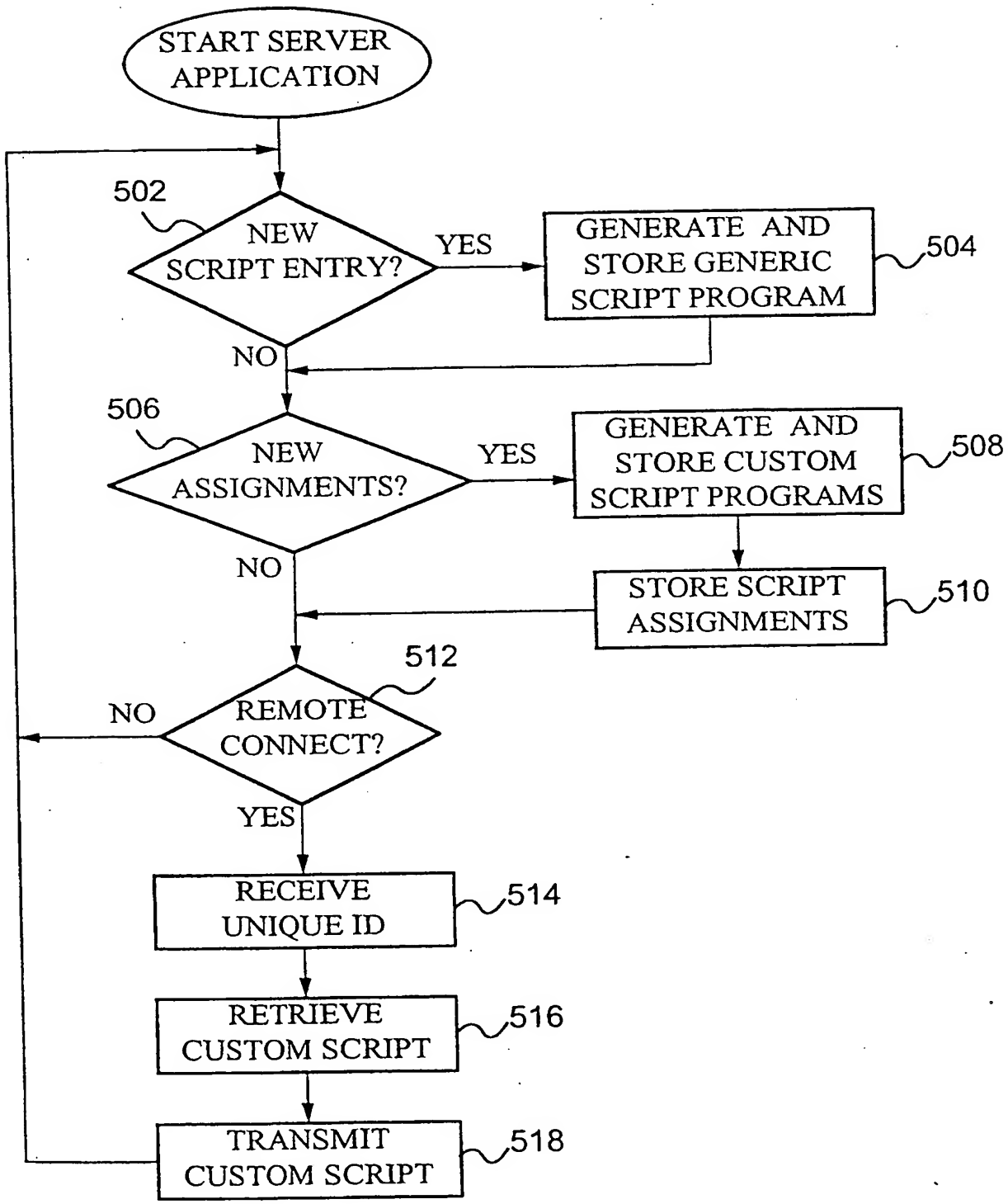
START SERVER APPLICATION
502
NEW SCRIPT ENTRY?
YES
GENERATE AND STORE GENERIC SCRIPT PROGRAM
504
NO
506
NEW ASSIGNMENTS?
YES
GENERATE AND STORE CUSTOM SCRIPT PROGRAMS
508
NO
STORE SCRIPT ASSIGNMENTS
510
512
NO
REMOTE CONNECT?
YES
RECEIVE UNIQUE ID
514
RETRIEVE CUSTOM SCRIPT
516
TRANSMIT CUSTOM SCRIPT
518

FIG. 15

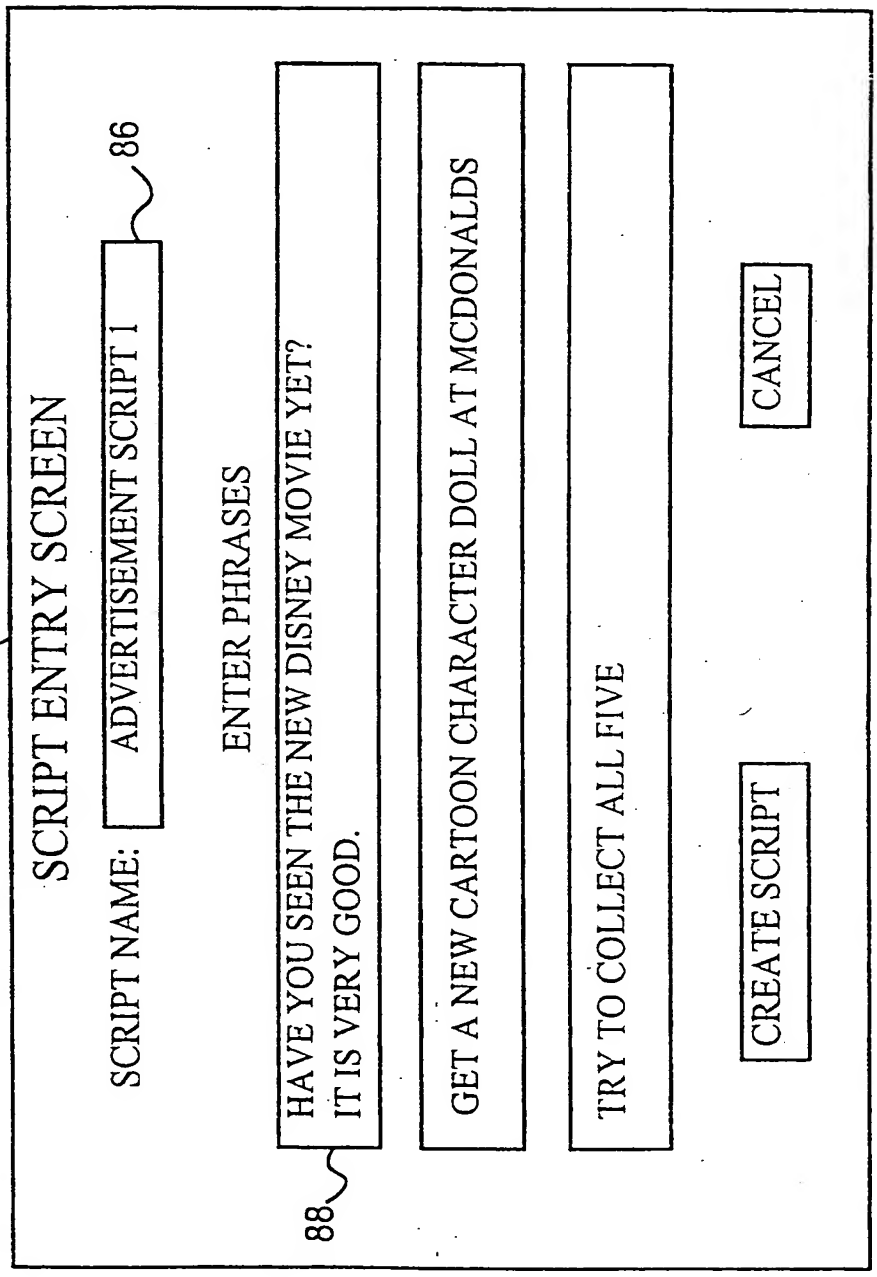
42
SCRIPT ENTRY SCREEN
SCRIPT NAME:
ADVERTISEMENT SCRIPT 1
86
ENTER PHRASES
HAVE YOU SEEN THE NEW DISNEY MOVIE YET?
IT IS VERY GOOD.
88
GET A NEW CARTOON CHARACTER DOLL AT MCDONALDS
TRY TO COLLECT ALL FIVE
CREATE SCRIPT
CANCEL

FIG. 16

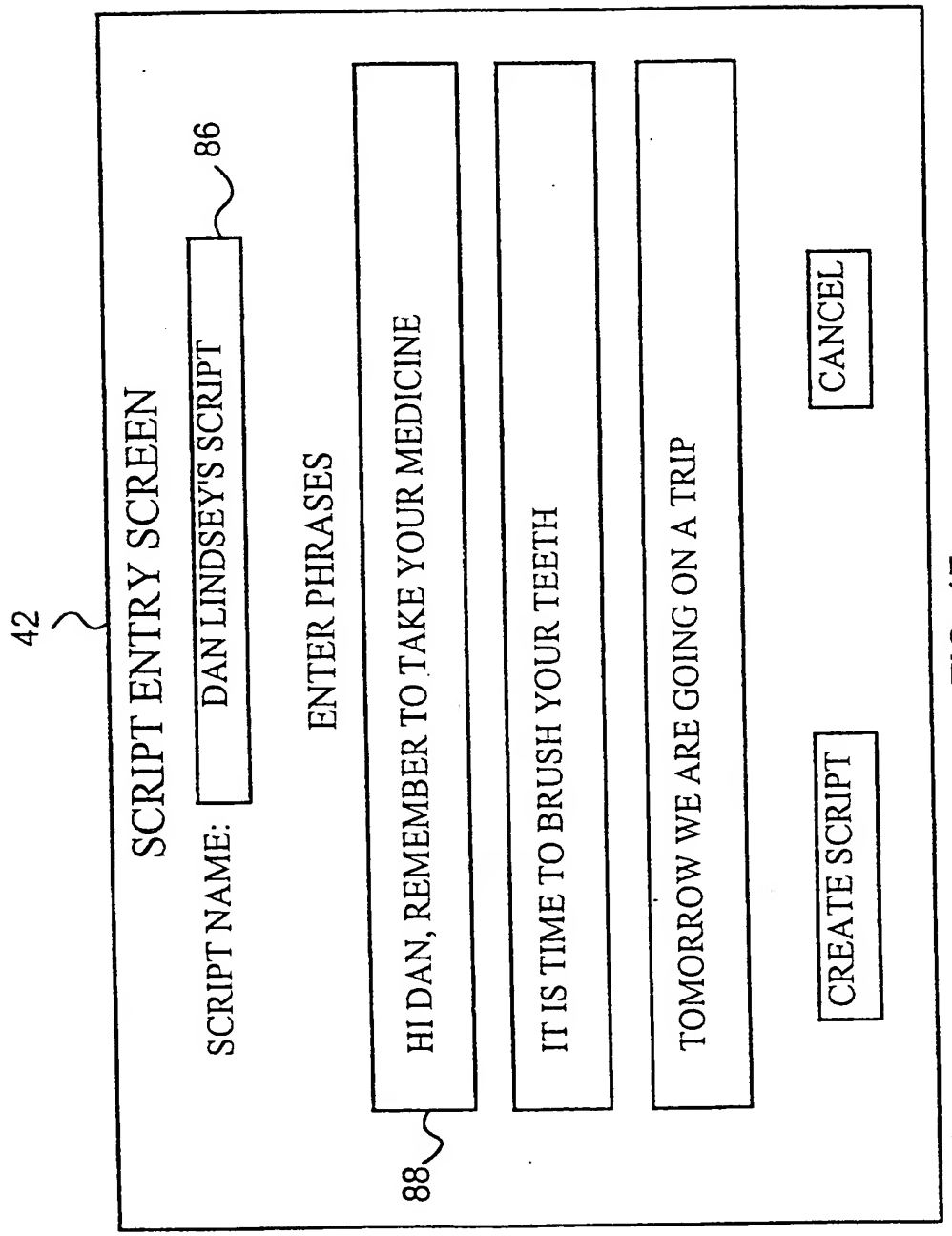
42
SCRIPT ENTRY SCREEN
SCRIPT NAME:
DAN LINDSEY'S SCRIPT
86
ENTER PHRASES
HI DAN, REMEMBER TO TAKE YOUR MEDICINE
IT IS TIME TO BRUSH YOUR TEETH
TOMORROW WE ARE GOING ON A TRIP
88
CREATE SCRIPT
CANCEL

FIG. 17

INTERNATIONAL SEARCH REPORT

Inte ional Application No
PCT/US 98/21215

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A63H3/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A63H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 508 912 A (INFO TELECOM) 14 October 1992 see the whole document ---	1,5,12
A	WO 94 08677 A (JANI JEFFREY SCOTT) 28 April 1994 see the whole document ---	1,5,12
A	US 4 846 693 A (BAER RALPH H) 11 July 1989 cited in the application ---	1,5,12
A	US 4 840 602 A (ROSE WILLIAM J) 20 June 1989 cited in the application ---	1,5,12
	-/--	

[X] Further documents are listed in the continuation of box C.

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16 February 1999	23/02/1999

Name and mailing address of the ISA	Authorized officer
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Inte ional Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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